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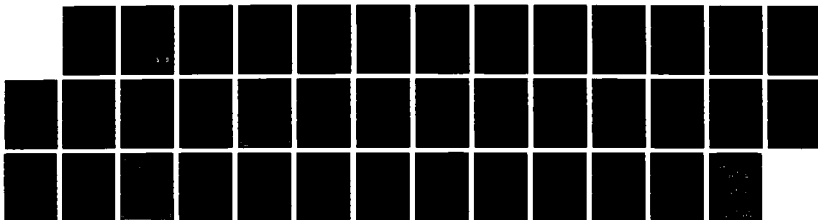
INTERNATIONAL CONFERENCE ON ULTRASTRUCTURE PROCESSING  
OF CERAMICS GLASSES. (U) CALIFORNIA UNIV LOS ANGELES  
DEPT OF MATERIALS SCIENCE AND ENG. J D HACKENZIE  
APR 88 AFOSR-TR-88-0676 AFOSR-87-0085

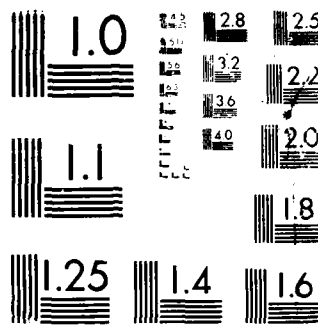
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<p>An International Conference was organized and held on Feb 23-27, 1987 in San Diego, CA. The meeting was attended by 250 people from 11 countries. There were 60 oral presentations and 42 poster presentations. The Conference Proceedings will be published by John Wiley &amp; Sons, New York in 1988</p> <p style="text-align: right;"><b>DTIC ELECTE</b> <b>S JUN 30 1988 D</b> <b>H</b></p>					
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# COMPLETED PROJECT SUMMARY

TITLE: Third International Conference on Ultrastructure Processing of Ceramics, Glasses and Composites

PRINCIPAL INVESTIGATOR: Professor John D. Mackenzie  
Department of Materials Science and Engineering  
University of California  
Los Angeles, CA 90024-1595

INCLUSIVE DATES: 01/01/87 to 12/31/87

CONTRACT/GRANT NUMBER: AFOSR-87-0085

SENIOR RESEARCH PERSONNEL: None

JUNIOR RESEARCH PERSONNEL: None

## PUBLICATIONS:

"Ultrastructure Processing of Advanced Ceramics," edited by J.D. Mackenzie and D.R. Ulrich, John Wiley and Sons, New York, New York (1988).

## ABSTRACT OF OBJECTIVES AND ACCOMPLISHMENTS:

1. The objectives for this Third Conference were similar to those of the two previous ones (Florida, 1983 and 1985), namely to establish and to strengthen the scientific foundation for a new era in the processing of ceramics, glasses and composites for electronic, optical, structural and novel applications. In the past few years, attempts to understand and to control the processing of these materials on a submicron and even molecular scale through direct interactions between chemists, materials scientists, engineers and physicists, made possible by the support of AFOSR and others, have already led to new materials, novel processes and improved properties. Further progress would be enhanced through the sharing of research results and ideas via this forthcoming Third Conference.
2. The Conference was successfully organized and took place at the San Diego Princess Resort in San Diego, California from February 23 to 27, 1987. Two-hundred and fifty people attended. There were 60 oral presentations and 42 poster presentations. The conference proceedings will be published in the form of a book entitled "Ultrastructure Processing of Advanced Ceramics," edited by J.D. Mackenzie and D.R. Ulrich, in June, 1988.

UNIVERSITY OF CALIFORNIA, LOS ANGELES  
SCHOOL OF ENGINEERING AND APPLIED SCIENCE  
LOS ANGELES, CALIFORNIA 90024-1595

**Final Technical Report**

to

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

on project

**Third International Conference on Ultrastructure  
Processing of Ceramics, Glasses and Composites**

Grant No.: AFOSR 87-0085

Inclusive Dates:

1 January 1987 to 31 December 1987

**Principal Investigator**

J.D. Mackenzie  
Professor of Engineering and Applied

April, 1988

Approved for public release,  
distribution unlimited

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First Announcement  
 Second Announcement  
 Program  
 Registration List



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## ABSTRACT

The Third International Conference on Ultrastructure Processing of Ceramics, Glasses, and Composites was successfully organized and held in San Diego, California from February 23 to 27, 1987. There were 250 attendees from eleven countries. There were 60 oral presentations and 42 poster presentations on all aspects of ultrastructure processing. The Conference Proceedings will be published by John Wiley and Sons, New York, in the form of a book entitled "Ultrastructure Processing of Advanced Ceramics," edited by J.D. Mackenzie and D.R. Ulrich, in June, 1988. The book will contain 83 articles and will be in excess of 1,000 printed pages.

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First Announcement	
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## 1. Introduction

During the past decade, interests in the processing of ceramics have been shifting from the micron-scale to the submicron scale of powders. Simultaneously there has been a growing interest in the sol-gel process to produce glasses. In addition, the use of metal-organic compounds as precursors has been successful in the preparation of silicon carbide fibers. The concept of controlling processes at almost the molecular scale to produce new ceramics, glasses and composites led the University of Florida to organize the First International Conference on Ultrastructure Processing in February, 1983. The Conference with Professor L.L. Hench of the University of Florida and Dr. D.L. Ulrich of the Air Force Office of Scientific Research as Co-Chairmen and sponsored by the Directorate of Chemical and Atmospheric Science of AFOSR, was an immediate success. More than 200 scientists from the disciplines of materials science, ceramics, polymer, chemistry, physics and mechanics were able to learn from one another. The Conference also resulted in the publication of a very valuable book by John Wiley and Sons in 1984. The success of the First Conference prompted Professor Hench and Dr. Ulrich to organize the Second International Conference on Ultrastructure Processing in February, 1985. The Second Conference attracted an even larger number of participants. Again it was a clear success and the proceedings will again be published by John Wiley and Sons in 1986. These two international meetings have permitted scientists from different disciplines to explore new ideas together not only in fundamental research but in applications as well. The demonstrated success and the high probability that more innovations will be developed as a result of this type of meeting demanded that a Third International Conference be organized for 1987.

A proposal was thus submitted to the Air Force Office of Scientific Research to support a Third Conference to be sponsored by the Department of Materials Science and Engineering, University of California, Los Angeles. The proposal was approved and the Conference was subsequently held in San Diego, California, from February 23-27, 1987.

## **2. Conference Objectives and Plans**

The objectives for this Third Conference was similar to those of the two previous ones (Florida, 1983 and 1985), namely to establish and to strengthen the scientific foundation for a new era in the processing of ceramics, glasses and composites for electronic, optical, structural and novel applications. In the past few years, attempts to understand and to control the processing of these materials on a submicron and even molecular scale through direct interactions between chemists, materials scientists, engineers and physicists, made possible by the support of AFOSR and others, have already led to new materials, novel processes and improved properties. Further progress would be enhanced through the sharing of research results and ideas via this Third Conference.

The plan of the Conference was to bring together leading researchers from different disciplines who were involved in understanding the processing of ceramics, glasses and composites on a submicron level and how to control the microstructure and properties of such materials. Most speakers would be by invitation. Contributed papers would be accepted based upon review of the abstracts submitted. Posters would also be accepted and new research especially welcome. A Conference Proceedings would be published probably again by John Wiley and Sons. The following topics would be covered:

- Sol-gel processes and processing
- Ultrafine powder processing
- Applications of ultrastructure processing
- Chemical precursors for ultrastructure processing
- Relation between ultrastructures and properties of solids
- Ultrastructures in macromolecular materials
- Theoretical aspects of ultrastructure development

### 3. Organization and Location

The co-chairmen was Professor J.D. Mackenzie (UCLA) and Dr. Donald R. Ulrich (AFOSR). The faculty of the Department of Materials Science and Engineering of UCLA voted to sponsor the Conference. Because of the unavailability of meeting facilities on campus, the San Diego Princess Resort at San Diego was selected to be the Conference site. A copy of the Preliminary Announcement sent out to over a thousand people is attached in the Appendix. A copy of the Second Announcement sent out in late 1986 is also attached. The Conference was successfully held from February 23-27, 1987.

### 4. Program

Because of excessive demand, the times were extended each day to accommodate all the oral presentations. Professor W.D. Kingery (MIT) was the Keynote Speaker on February 24 and presented a 50 minute address on "History of Ceramic Processing." There was a total of 60 oral presentations and 42 Poster presentations. A copy of the official program listing speakers and title of papers is attached in the Appendix. After dinner on

February 25, Dr. J.O. Dimmock, Technical Director of AFOSR gave an address entitled, "The Role of Air Force Basic Research."

In addition to Professor Kingery, the following distinguished scientists were invited speakers:

From the U.S.A. - I.A. Aksay (University of Washington), H.R. Allcock (Penn State), H.K. Bowen (MIT), D.E. Clark (Univ. of Washington), M.F. Hawthorne (UCLA), L.L. Hench (Univ. of Florida), L.V. Interrante (RPI), J. Jonas (Univ. of Illinois), F.F. Lange (Rockwell International), J.D. Mackenzie (UCLA), J.E. McGrath (VPI), P. K. McCrone (RPI), E. Matijevic (Clarkson), R. Roy (Penn State), G.W. Scherer (DuPont), D. Seyferth (MIT), N.J. Turro (Columbia Univ.), D.R. Uhlmann (Univ. of Arizona), J.L. White (Aerospace Corp.)

From Overseas - R. Corriu (France), L. Cot (France), J. Fricke (West Germany), J. Livage (France), K. Okamura (Japan), S. Sakka (Japan), H. Schmidt (West Germany), and J. Zarzycki (France).

## **5. Attendance**

The original plan was to limit the number of attendees to 200 people. However, excessive demands from industry and university to present poster papers and to attend the Conference persuaded the Conference Co-Chairmen to extend the attendance. Subsequently, 250 people attended, with participants from 11 countries. A copy of the Registration List is attached in the Appendix.

## **6. Conference Proceedings**

A great majority of the papers presented were submitted for publication. The papers were all reviewed by selected experts. The Conference Proceedings will be published by John

Wiley and Sons, Inc., New York, as a book entitled "Ultrastructure Processing of Advanced Ceramics," edited by J.D. Mackenzie and D.R. Ulrich. The book will be in print by June, 1988 and will have 82 chapters plus the article by Professor W.D. Kingery.

## APPENDIX

PRELIMINARY ANNOUNCEMENT  
and  
CALL FOR PAPERS

THIRD INTERNATIONAL  
CONFERENCE  
on  
ULTRASTRUCTURE PROCESSING  
OF CERAMICS  
GLASSES AND COMPOSITES



FEBRUARY 23-27, 1987  
CATAMARAN RESORT HOTEL  
SAN DIEGO, CALIFORNIA



Sponsored by:  
University of California, Los Angeles  
Department of Materials Science and Engineering

Supported by\*:  
Directorate of Chemical and Atmospheric Sciences  
U.S. Air Force of Scientific Research

\*Support pending

To: Professor J.D. Mackenzie  
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University of California  
Department of Materials Science and Engineering  
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Hilgard Avenue  
Los Angeles, CA 90024  
U.S.A

TO: J.D. MACKENZIE, Ultrastructure Processing Conference

Name: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_

- ☐ Please send me the next circular  
☐ I am interested in attending  
☐ I may be accompanied by a non-conference attendee  
☐ I plan to submit a paper

Tentative Title of Paper \_\_\_\_\_

## LOCATION AND ARRANGEMENTS

The conference will be held at the Catamaran Resort Hotel in San Diego, California, U.S.A. The hotel has its own beach on Mission Bay and is 5 miles from San Diego International Airport. San Diego, renowned for its mild year-round climate, Sea World, Zoo, shops, restaurants and sporting facilities, is ten miles from the Mexican border and 100 miles from Los Angeles. A block of rooms has been reserved at the hotel at \$64/night for single and \$68/night for double or twin occupancies. Although no program is presently planned for accompanying persons, sight-seeing and other activities can be arranged through the hotel.

## PAPERS AND ABSTRACTS

Authors wishing to contribute a paper will be required to submit a short abstract (no more than 100 words) no later than September 1, 1986. These will be used as a basis for judging acceptance. A manuscript must be made available for inclusion in the proceedings no later than February 23, 1987. Those unable to meet the above deadlines may wish to present their recent research at the poster sessions planned.

*Those interested in this meeting should return the attached tear-out form or contact J.D. Mackenzie at (213) 825-3539.*

## CONFERENCE OBJECTIVES

The objectives of this Third Conference are similar to those of the two previous ones (Florida, 1983 and 1985), namely to establish and to strengthen the scientific foundation for a new era in the processing of ceramics, glasses and composites for electronic, optical, structural and novel applications. In the past few years, attempts to understand and to control the processing of these materials on a submicron and even molecular scale through direct interactions between chemists, materials scientists, engineers and physicists, made possible by the support of AFOSR and others, have already led to new materials, novel processes and improved properties. Further progress will be enhanced through the sharing of research results and ideas via this forthcoming Third Conference.

## CONFERENCE PLAN

To bring together leading researchers from different disciplines who are involved in understanding the processing of ceramics, glasses and composites on a submicron level and how to control the microstructure and properties of such materials. Most speakers will be by invitation. Contributed papers will be accepted based upon review of the abstracts submitted. Posters will also be accepted and new research especially welcome. A Conference Proceedings will be published. The following topics will be covered:

- \* *Sol-Gel processes and processing*
- \* *Ultrafine powder processing*
- \* *Applications of ultrastructure processing*
- \* *Chemical precursors for ultrastructure processing*
- \* *Relation between ultrastructures and properties of solids*
- \* *Ultrastructures in macromolecular materials*
- \* *Theoretical aspects of ultrastructure development*

## ORGANIZATIONS

The co-chairman will be Professor J.D. Mackenzie (University of California) and Dr. D.R. Ulrich (AFOSR) who will also be the co-editors of the Conference proceedings.

*SECOND ANNOUNCEMENT  
and  
LAST CALL FOR PAPERS*

THIRD INTERNATIONAL  
CONFERENCE  
on  
ULTRASTRUCTURE PROCESSING  
OF CERAMICS  
GLASSES AND COMPOSITES



FEBRUARY 23-27, 1987  
VACATION VILLAGE RESORT  
SAN DIEGO, CALIFORNIA



Sponsored by:  
University of California, Los Angeles  
Department of Materials Science and Engineering

Supported by:  
Directorate of Chemical and Atmospheric Sciences  
U.S. Air Force or Scientific Research

\*Support pending

## CONFERENCE OBJECTIVES

The objectives of this Third Conference are similar to those of the two previous ones (Florida, 1983 and 1985), namely to establish and to strengthen the scientific foundation for a new era in the processing of ceramics, glasses and composites for electronic, optical, structural and novel applications. In the past few years, attempts to understand and to control the processing of these materials on a submicron and even molecular scale through direct interactions between chemists, materials scientists, engineers and physicists, made possible by the support of AFOSR and others, have already led to new materials, novel processes and improved properties. Further progress will be enhanced through the sharing of research results and ideas via this forthcoming Third Conference.

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- \* Chemical precursors for ultrastructure processing
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- \* Ultrastructures in macromolecular materials
- \* Theoretical aspects of ultrastructure development

## ORGANIZATIONS

The co-chairman will be Professor J.D. Mackenzie (University of California) and Dr. D.R. Ulrich (AFOSR) who will also be the co-editors of the Conference proceedings.

## LOCATION AND ARRANGEMENTS

The conference will now be held at the Vacation Village Resort in San Diego. The hotel has its own beach on Mission Bay and is 5 miles from San Diego International Airport. San Diego, renowned for its mild year-round climate, Sea World, Zoo, shops, restaurants and sporting facilities, is 10 miles from the Mexican border and 100 miles from Los Angeles. A block of rooms has been reserved at the hotel at \$70/night for single or double occupancies. Most of the rooms have two beds. Many sight-seeing trips and visits to tourist attractions can be arranged through the hotel.

## HOTEL RESERVATIONS

Please use the enclosed envelope for hotel reservation. The envelope and one night's deposit must reach the hotel by January 22. Reservations received after that date will be on a space available basis. The cheap rate of \$70 per room is also applicable for the week-ends immediately before and after the conference. Suites cost from \$130/night, have kitchenettes and are suitable for families.

## CONFERENCE REGISTRATION

The prepaid cost of participation will be \$230 per attendee. This fee includes a copy of the proceedings, abstract of papers, 2 dinners, 4 luncheons, 1 reception and refreshments at the meeting. Non-attending guests may purchase meal tickets. The enclosed Registration Form and full payment should reach Professor J.D. Mackenzie no later than January 22. Refund will be made if cancellation request is received by February 16. Registration fee at the Conference will be \$260 per attendee.

## PAPERS AND ABSTRACTS

Authors wishing to contribute a paper will be required to submit a 100 words abstract no later than October 15. This will be used as a basis for judging acceptance. A manuscript must be made available for inclusion in the proceedings no later than February 23, 1987. Those unable to meet the deadline may wish to present their recent research at the poster session.

## TENTATIVE PROGRAM

A reception will be held on Monday evening, February 23. Technical sessions will be held on Tuesday a.m. and p.m., Wednesday a.m., Thursday a.m. and p.m. and Friday a.m. Wednesday afternoon will be left free for personal discussions and/or relaxation. A poster session will be held.

Professor W. D. Kingery of M.I.T. will present a keynote lecture entitled "History of Ceramics Processing". Other speakers will include:

From the U.S.A. — I. A. Aksay, H. R. Allcock, H. K. Bowen, C. J. Brinker, D. E. Clark, L. L. Hench, J. Jonas, F. F. Lange, J. D. Mackenzie, J. E. McGrath, R. K. McCrone, E. Matijevic, E. M. Rabinovich, R. Roy, G. W. Scherer, D. Seyferth, N. J. Turro, D. R. Uhlmann, J. L. White.

From Overseas — L. Cot (France), J. Fricke (W. Germany), J. Livage (France), K. Okamura (Japan), H. W. Rosenberg (U. K.), S. Sakka (Japan), H. Schmidt (W. Germany), and J. Zarzycki (France).

Further information can be obtained from Professor J. D. Mackenzie at the address shown or at (213) 825-3539.

# Registration List

## Third International Conference On Ultrastructure Processing Of Ceramics, Glasses And Composites

SAN DIEGO PRINCESS  
San Diego, California  
February 23-27, 1987

*Sponsored by :*  
*University of California, Los Angeles*  
*Department of Materials Science and Engineering*

*Supported by:*  
*Directorate of Chemical and Atmospheric Sciences*  
*U. S. Air Force Office of Scientific Research*

**UCLA/Department of Materials Science and Engineering**

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# PROGRAM

## Third International Conference On Ultrastructure Processing Of Ceramics, Glasses And Composites

SAN DIEGO PRINCESS  
San Diego, California  
February 23-27, 1987

*Sponsored by :*  
*University of California, Los Angeles*  
*Department of Materials Science and Engineering*

*Supported by:*  
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*Co - Chairpersons :*

**Dr. J. D. Mackenzie**

**Dr. D. R. Ulrich**

*Local Organizing Committee :*

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**Akihiko Sugitani**

**Ting J. Yuen**

**Rafael J. Zaldivar**

**MONDAY, FEBRUARY 23, 1987**

4:00 - 8:00 PM            Registration  
6:00 - 8:00 PM            Welcoming Party

**TUESDAY, FEBRUARY 24, 1987**

7:00 - Noon                Registration  
1:00 - 5:00 PM

8:30                        Welcome : J. D. Mackenzie and D. R. Ulrich

**SESSION I : KEYNOTE ADDRESS**

8:40 - 9:30                **Professor W. D. Kingery**  
                                 **History of Ceramic Processing**

**SESSION II : PRECURSORS AND CHEMISTRY FOR ULTRASTRUCTURE PROCESSING**

Co-Chairs : D. Ball, H. R. Allcock

9:40	1	Organometallic Polymer Precursors to Ceramics: New Systems	Seyferth, D.	MIT
10:10	2	Silicon and Aluminum-Containing Carboranes as Potential Ceramic Precursors	Hawthorne, M. F., Rees, Jr., W. S., Schubert, D. M. and Knobler, C. B.	UCLA
10:40		COFFEE		
11:00	3	Sol-Gel Glasses: Investigations of Fundamental Chemistry Features and Siloxane Modification	McGrath, J. E., Pullockaren, J., Riffle, J. S. and Smith, S. D.	VPI
11:30	4	Chemical Modifications of Titanium Alkoxide Precursors	Sanchez, C., Babonneau, F., Doeuff, S., Henry, M. and Leautic, A.	Paris VI, France
11:50	5	Processible Boron Nitride Preceramic Polymers	Paciorek, K. L.	Ultrasystems
12:10		LUNCH		
1:15	6	Preparation of Aluminum Nitride and AlN/SiC Solid Solutions Using Organometallic Precursors	Interrante, L. V., Hackney, M., Whitmarsh, C. and Zhiping, J.	RPI
1:35	7	Some New Possibilities for the Preparation of Silica Gels	Corriu, R., Pauthe, M., Phalippou, J., Leclercq, D. and Vioux, A.	Montpellier, France
1:55	8	Polymer Precursors & Model Systems for Graphite Materials	Dalton, L., Nalwa, H., Thomson, J., Young, C. and Bryson, P.	USC

### SESSION III : SOL-GEL SCIENCE AND TECHNOLOGY

Co-Chairs : A. Guenther , J. Zarzycki

2:15	9	Optical Properties of Gel-SiO <sub>2</sub> Glasses	Hench, L.L., Wang, S.K., and Campbell, C.	Univ. of Florida
2:45	10	Various Factors Affecting the Conversion of Silicon Alkoxide Solutions to Gels	Sakka, S., Kozuka, H. and Kim, S.	Institute for Chemical Research, Kyoto Univ., Japan
3:15	11	Time-Dependence of the Viscosity of Sol-Gel Processed Silica	Klein, L. C. and Gallo, T. A.	Rutgers Univ.
3:35		COFFEE		
3:50	12	A Predictive Model for Inorganic Polymerization Reactions	Livage, J. and Henry, M.	Paris VI, France
4:20	13	Growth Process of Al <sub>2</sub> O <sub>3</sub> -SiO <sub>2</sub> Gels	Pouxviel, J. C. and Boilot, J. P.	Ecole Polytechnique, France
4:40	14	Ultrafilters by the Sol-Gel Process	Cot, L.	ENSC Montpellier, France
5:00	15	Fundamentals of Sol-Gel Film Formation	Brinker, C. J. and Hurd, A. J.	Sandia National Laboratories
5:20	16	Isotopic Effects in Alkoxysilane Sol-Gel Processing	Hardman-Rhyne, K. A., Coyle, T. D., and Lewis, E. P.	National Bureau of Standards

6:00 - 7:00 PM POSTER SESSION

(Posters are listed at the back of the program)

8:00-10:00 DINNER, Guest Speaker: Dr. J. O. Dimmock, Technical Director of A. F. O. S. R., "The Role of Air Force Basic Research"

WEDNESDAY, FEBRUARY 25, 1987

SESSION III : SOL-GEL SCIENCE AND TECHNOLOGY ( Continued )

Co-Chairs : M. Ohmer , L. L. Hench

8:00	17	Coatings: The Land of Opportunity for Sol-Gel Technology	Uhlmann, D. R.	Univ. of Arizona
8:30	18	Sonogels: An Alternative Method in Sol-Gel Processing	Zarzycki, J. and Esquivias, L.	Univ. of Montpellier, France
9:00	19	Magnetic Properties of Some Sol-Gel Ferrites	MacCrone, R. K. and Lieb, S.	RPI
9:20	20	Rheology of Particulate Silica Gels	Rabinovich, E. M. and Kopylov, N. J.	Bell Labs
9:40	21	Drying Mechanics of Gels	Scherer, G. W.	DuPont
10:00		COFFEE		
10:15	22	NMR and Raman Studies of Mixed Alkoxide Systems	Jonas, J., Irwin, A. D., Holmgren, J. S. and Zerda, T. W.	Univ. of Illinois
10:35	23	Amine-Silicate: An Alternative Gel Method for the Synthesis of Amorphous Silicates	Guglielmi, M. and Maliavski, N.	U of Padova, Italy
10:55	24	Effect of Acetic Acid on the Chemistry of Silica Sol-Gels	Campero, A., Arroyo, R. and Sanchez, C.	Mexico Paris VI, France
11:15	25	Effect of Polycondensation Reactions on the Microstructure in Alumina System	Yoldas, B.E.	PPG
11:35	26	Formation of Complex Fused Silica Shapes by a Silicate Gelation Process	Shoup, R. D.	Coming Glass
11:55	27	Effects of Temperature and Time on the Structural Evolution of Alkoxy-Derived Silica Gel	Yasumori, A., Yamane, M. and Kawaguchi, T.	Tokyo Inst. of Tech. Asahi Glass
12:15	28	A Theoretical Study of the Silanol Polymerization Mechanism	Davis, L. P. and Burggraf, L. W.	AFOSR
12:35	29	Influence of Formation Parameters on the Mechanical Properties of Gels	Modugno, S. A., Fleming, J. W. and Klein, L. C.	Bell Labs Rutgers Univ.

LUNCH (Break for the Rest of the Day)

THURSDAY, FEBRUARY 26, 1987

SESSION IV : POWDERS AND COLLOIDS

Co-Chairs : K. S. Mazdhyasni , S. Sakka

8:00	30	Colloidal Processing of Ceramic Composites with Ultrafine Particles	Aksay, I. A.	Univ. of Washington
8:30	31	Preparation of Oxide Powders	Bowen, H. K., Riman, R., McMahon, T., Bagley, A., Gowda, G., Hoppener, R. and Rhine, W.	MIT
9:00	32	Preparation and Interactions of Colloids of Interest in Ceramics	Matijevic, E.	Clarkson Univ.
9:30	33	Synthesis of Alumina-Zirconia Powders by Sol-Gel Processing	Bond, W. D. and Becher, P. F.	Oak Ridge Nat. Lab.
9:50	34	Theoretical Aspects of Interaction Between Colloidal Particles with Various Shapes in Liquid	Tateyama, H., Hirose, H., Nishimura, S., Tsunematsu, K., Jinnai, K. and Imagawa, K.	Gov. Ind. Res. Inst. Kyushu Saga, Japan
10:10		COFFEE		
10:25	35	Stabilized Aluminum Acetate Used for an Alumina Source in Ceramic Fibers	Everitt, G. F.	3M
10:45	36	Monodisperse Silica Powders: How to Control Their Size	Zukoski, C. F., Bogush, G. H. and Tracy, R. M.	Univ. of Illinois
11:05	37	Precipitation and Properties of PZT and PLZT Powders	Schwartz, R. W., Payne, D.A., Eccles, P. M. and Eichorst, D. J.	Univ. of Illinois

# SESSION V : ADVANCED CERAMICS

Co - Chairs : L. Smith , H. Schmidt

11:25	38	Formation of SiC Fibers and Related Ceramic Fibers from Polycarbosilane	Okamura, K., Sato, M. and Hasegawa, Y.	RIISOM, Tohoku U Oarai Res. Inst. Spec. Inorg. Mat. Asahi, Japan
11:55	39	The Chemical Synthesis of Nanoscale Carbides and Cermets	McCandlish, L. E. and Polizzotti, R. S.	Exxon
12:20		LUNCH		
1:15	40	Controlling Microstructures through Phase Partitioning from Metastable Precursors	Lange, F. F., Marshall, D. B. and Porter, J.	UCSB Rockwell Sc. Center
1:45	41	Disclination Structures in Carbon and Graphite	White, J. L.	Aerospace Corp.
2:15	42	Nanostructure and Mechanical Properties of SiC Using Organosilicon Precursors	Niihara, K., Yamamoto, T., Suganuma, K., Takemoto, T. Nishikawa, T. and Okumura, M.	National Defense Academy, Yokosuka Shin Nisso Kako, Tokyo, Japan
2:35	43	Sol Gel Processing of Acicular Particles of Barium Ferrites	Bernier, J. C. , Najmi, M. and Poix, P.	EHICS Strasbourg, France
2:55		COFFEE		

# SESSION VI : COMPOSITES, NOVEL MATERIALS AND TECHNIQUES

Co - Chairs : I. Goldfarb , E. Matijevic

3:10	44	Some New Advances with SSG Derived Nanocomposites	Roy, R.	Penn State U
3:40	45	Amorphous Oxides from Gels	Mackenzie, J. D.	UCLA
4:10	46	Photochemical Probes of the Structures of Porous Solids	Turro, N. J.	Columbia U
4:40	47	Aerogels - A Fascinating Class of Porous Solids	Caps, R. and Fricke, J.	U of Wurzburg, Germany
5:00	48	In-Situ Generation of Ceramic Particles for the Reinforcement of Elastomeric Materials	Mark, J. E.	U of Cincinnati
8:00-10:00		DINNER		

FRIDAY, FEBRUARY 27, 1987

SESSION VI : COMPOSITES, NOVEL MATERIALS AND TECHNIQUES (Continued)

Co - Chairs : A. Matuszko , A. Buckley

8:00	49	Sol/Gel Processing of Fiber-Reinforced Glass Matrix Composites	Pantano, C. G. and Qi, D.	Penn State Univ.
8:20	50	Development of Organic-Inorganic Hard Coatings by the Sol-Gel Process	Schmidt, H., Seiferling, B. and Philipp, G.	FIS, Wurzburg, Germany
8:40	51	Non-Linear Optical Composite Materials Using CdS	Simmons, J. H., Clausen, Jr., E.M. and Potter, B. G.	U of Florida
9:00	52	Rheological Flow in Superplastic Fine-Grained Ceramic Composites	Wakai, F., Sakaguchi, S., Murayama, N. and Kato, H.	Gov. Ind. Res. Inst. Nagoya Suzuki Motor Co. Japan
9:20	53	Microstructural Definition of Ion-Exchanged Glass Optical Waveguides by Ion-Exchange Process	Ramaswamy, R. V., Chludzinski, P. and Anderson, T. J.	Univ. of Florida
9:40	54	A Versatile Anion Exchanger Derived from the Acid Hydrolysis of Titanium Alkoxides	Giannelis, E. P. and Berglund, K. A.	Michigan State U.
10:00		COFFEE		
10:15	55	Linear Heteroatom Polymers and Their Relationship To Elastomers, Gels, and Ceramics	Allcock, H. R.	Penn State Univ.
10:45	56	Poly[Benzobisthiazole] (PBT)/ Sol-Gel Glass Microcomposites	Kovar, R. F. and Lusignea, R. W.	Foster-Miller
11:05	57	Strength Limiting Features of Polymer Derived Ceramic Fibers	Jaffe, M. and Sawyer, L. C.	Celanese Research
11:25	58	Growth of Alumina Fibers From Intercalated Graphite Precursor Fibers	McQuillan, B. W. and Reynolds, G.	GA Technologies
11:45	59	Role of Supercritical Drying in Structural and Microstructural Evolution of Gel-Glasses: A Critical Review	Mukherjee, S. P.	IBM
12:05	60	Catalytic Synthesis of Silicon Nitride Preceramic Polymers	Laine, R. M., Blum, Y. D., Tse, D., Glaser, R., Chow, A. and Hamlin, R.	SRI
12:25		Lunch and Closing Comments J. D. Mackenzie and D. R. Ulrich		

## POSTER SESSION

- |    |  |  |  |
|----|--|--|--|
| 1  | The Synthesis of Silicon Oxynitride and Si-Al-N-O Ceramics from Organosilicon Polymers                                 | Yu, Y. F. and Mah, T. I.   | Universal Energy Systems                 |
| 2  | Theoretical Studies of Pentacoordinated Silicon  | Gordon, M.S.   | North Dakota State                       |
| 3  | Chemistry of Multicomponent Alkoxide Precursors to Ultrastructure Processes  | Basil, J.D. and Lin, C.C.  | PPG Industries                           |
| 4  | Fluoropolymer Modified Silicate Glasses  | Doyle, W. F. and Uhlmann, D.R.                                   | MIT<br>Univ. of Arizona                  |
| 5  | Kinetics of Titanium Alkoxide Hydrolysis   | Berglund, K. A., Pryzbocki, C. and Giannelis, E. P.              | Michigan SU                              |
| 6  | The Use of GC/MS in the Study of the Hydrolysis and Condensation of Tetraalkoxysilanes                                 | Wheeler, G.  | Metro. Mus. of Art                       |
| 7  | Characterization of Alkoxide-Derived Alumina Sols by Gel Filtration Chromatography and Small Angle X-Ray Scattering    | Olson, W. L. and Grill, C.M.                                     | Allied-Signal<br>Engineered Mat.         |
| 8  | Application of $^{183}\text{W}$ NMR to Study Polycondensation of Tungstic Acid Solutions                               | Chemseddine, A., Babonneau, F. and Livage, J.                    | UCLA<br>Paris VI, France                 |
| 9  | The Formation of Non-Bridging Oxygens in Silicate Gels studied by XPS  | Heo, J., Yuen, T. J., Nasu, H. and Mackenzie, J. D.              | UCLA                                     |
| 10 | An $^{27}\text{Al}$ -NMR DTA Study of the Thermal Evolution of Basic Aluminum Salt Derived Alumina                     | Wood, T. E.  | 3M                                       |
| 11 | Raman and FT-IR Spectroscopy of Rapid Sol-Gel Processes  | Che, T. M., Rafalko, J. J. and Dorain, P. B.                     | Celanese Res.<br>Amherst College         |
| 12 | Predicting the Evolution of Gel Microstructures from Viscosity-Time Relations  | Pope, E. J. A. and Mackenzie, J. D.                              | UCLA                                     |
| 13 | A Rheological Investigation of the Sol-Gel Transition of Orthosilicate Reacting Systems                                | Melpolder, S. M., Colby, R. H., Coltrain, B. K. and Kelts, L.W.  | Eastman Kodak                            |
| 14 | The Preparation of Silica-Gels Containing a Functional Group at Silicon: A Way for the Chemical Transformation of Gels | Pauthe, M. Phalippou, J., Corriu, R., Leclercq, D. and Vioux, A. | Montpellier, France                      |
| 15 | Elaboration and Characterization of Zirconia Gels  | Gharbi, N., Amara, C., Zarrouk, H., Sanchez, C. and Livage, J.   | Paris VI, France                         |
| 16 | Direct Observation of the Structure of Sols and Gels   | Mecartney, M. L., Bellare, J. and Bailey, J. K.                  | Univ. of Minnesota                       |
| 17 | The Effect of Processing on Gel-Glass Texture: A Review  | Orcel, G.  | Gel-Tech                                 |
| 18 | A Microcrystalline Growth Study of Solvent Effects in Alkoxides by Dynamic Laser Light Scattering                      | Byers, C. H. and Harris, M.T.                                    | Oak Ridge Nat. Lab.                      |
| 19 | Sintering Behavior of Sol-Gel Derived Anorthite and Cordierite Glass Powders   | Zelinski, B.J.J. and Uhlmann, D.R.                               | MIT<br>Univ. of Arizona                  |
| 20 | Aging Evolution of an Aluminum Hydroxide Gel Made from Aluminum Nitrate  | Uhlmann, D.R. and Pierre, A.C.                                   | Univ. of Arizona<br>Aerospatiale, France |
| 21 | Dielectric Relaxation Analysis Of Gel Drying   | Wallace, S. and Hench, L. L.                                     | Univ. of Florida                         |

22	Electrochemical Synthesis of Ceramic Films and Powders	Switzer, J. A.	Univ. of Pittsburgh
23	Competition between Densification and Nitridization in the Ammonolysis of Sol-Gel Derived Silica Films	Fabes, B. D., Dale, G. W. and Uhlmann, D. R.	MIT Univ. of Arizona
24	Fabrication and Mechanical Properties of $\text{Si}_3\text{N}_4/\text{SiC}$ Composites from Fine, Amorphous Si/N/C Powders	Izaki, K., Hakkei, K., Ando, K. Kawakami, T. and Niihara, K.	Mitsubishi Gas Nat. Def. Acad.
25	Synthesis of Fine Silicon Nitride and Silicon Carbide Powders by Carbothermic Reduction	Natansohn, S.	GTE Lab.
26	Zinc Sulfide Ceramic from Organometallics	Harris, D.C., Johnson, C.E., Roy, D.W. Hickey, D. K. and Willingham, C.B.	Naval Weapons Center, China Lake
27	Low Temperature Route to Ti, Zr, and Hf Diborides	Rhine, W. E.	MIT
28	Dispersion and Crystallization of Laser Derived $\text{Si}_3\text{N}_4$ Powders	Danforth, S. C., Symons, W. and Nilsen, K.	Rutgers Univ.
29	Synthesis of Sialon-SiC Composite from Vycor Type Porous Glass	Kim, B. H. and Kim, W. S.	Korea Univ.
30	Processing and Pyrolysis of $\text{Si}_3\text{N}_4$ / Polysilazane Bodies	Schwartz, K. B. and Rowcliffe, D. J.	SRI
31	Effect of Drying and Annealing on Metallo-Organic Solution Deposition of PZT Films	Lipeles, R. A. and Coleman, D. J.	Aerospace
32	Organometallic Processing for the Elaboration of $\text{MgTiO}_3$ and $\text{BaTiO}_3$ Ceramics	El Hadigui, S., Vilminot, S., Bernier, J. C., Poix, P. and Rehspringer, J. L.	EHICS Strasbourg, France
33	Characterization of Copper-Doped Materials Prepared By The Sol-Gel	Sanchez, C., Campero, A. and Arroyo, R.	Paris VI, France Mexico
34	Preparation of Barium and Strontium Titanate by Co-precipitation	Rehspringer, J. L., Nadouf, M., Poix, P. and Bernier, J. C.	Montpellier, France
35	Preparation of $\text{PbTiO}_3$ Powder by Sol-Gel and Co-Precipitation Method for Flexible Piezoelectric Composite	Safari, A.	Rutgers Univ.
36	Early Transition Metal Silicon Compounds	Tilley, T. D., Roddick, D., Arnold, J. Campion, B. and Zhang, C.	UC San Diego
37	Ultra-High Vacuum Deposition of Titanium- Based Multilayers; Application of Pulsed Molecular Beam Sources to Compose Designed Ceramic Films	Nozoye, H., Nishimiya, N., Kawaguchi, K. and Shin, S.	Nat. Chem. Lab. Ind., Tsukuba, Japan
38	PTFE-Silicate Composite Materials Via Sol-Gel Processes	Fabes, B. D. Doyle, W.F., Root, J. and Uhlmann, D.R.	MIT Univ. of Arizona
39	Surface Modification of Carbon Matrix Materials with Transition Metal Silicon Compounds	Tilley, T. D. and Streckert, H.	UC San Diego GA Technologies
40	Silsesquioxane-derived Fibers and Composites	Hurwitz, F.	NASA
41	Sol-Gel Methods for $\text{SiO}_2$ Optical Fiber Coatings	Covino, J. and Wilson, K.	Naval Weapons Center Rutgers Univ.
42	Sol-Gel Coatings	Clark, D. E.	Univ. of Florida

END

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